A model study on flapless implant positioning and complications

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Some implant companies advocate that flapless surgery to be easy to perform and beneficial for aesthetics and patient morbidity. However, studies objectively analyzing the position in the bone of implants installed with this approach are lacking. This *in vitro* model study was performed to analyze deviations in position and inclination of implants placed with flapless surgery compared with the ideally planned position and to examine whether the outcome is affected by experience level.

Identical radio-opaque models were developed with six edentulous single tooth spaces. Eighteen clinicians (six implantologists, six general dentists and six students) drilled four implant sites each with a flapless approach. Corresponding CT-scan images of the models were available. A virtual implant program (Simplant, Materialise NV, Leuven, Belgium) was used to plan the ideal position and to compare this with the implant angulation and position of the test implants.

Test implants differed significantly from the planned positions. Deviations in angle, depth and horizontal position showed no general significant differences between the three groups. As a consequence of malpositioning, perforations were seen in 42–46% of the cases.

These deviations could lead in a clinical situation to complications such as loss of implant stability and aesthetical or phonetical consequences. The outcome, however, is not influenced by the level of experience with implant surgery. This points out that more precise measurements of soft tissue *in situ* or additional use of guiding systems are recommendable.

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